

THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

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DARING HEART SURGERY SAVES GIRL'S LIFE

Cutting into the heart valves for the relief of disease has been successfully performed at the Peter Bent Brigham Hospital, Boston, Mass., it was recently learned. For the first time in the history of medicine, a human being has undergone this operation and recovered.

The patient was a little girl 12 years old who for a long time had suffered from shortness of breath, bloody sputum, cough and other symptoms which had confined her to bed ever since an attack of "flu" in 1918. She could not lie flat in bed but had to sit up to breathe, and her heart was so large that the ribs protruded. In general, the clinical picture was one of so-called "mitral stenosis"; that is, the valves which lie between the upper and lower chambers of the heart on the left side were so contracted that the blood could with difficulty circulate from one chamber to the other. This caused a damming back of blood in the lungs and consequent shortness of breath and spitting up of blood which had accumulated and could not move on.

Operation was performed during the visit of Prof. Wenckebach of Vienna who was very enthusiastic in his approval of the courage and skill of the two young surgeons, Dr. Elliott C. Cutler and Dr. S. A. Levine who are connected with the Surgical Clinic and Laboratory of Surgical Research of the Harvard Medical School.

At 7 o'clock in the morning the patient was given a dose of morphine and atropine to quiet her nerves and to diminish the amount of ether which must be given. One hour later, she was brought to the operating room and X-ray pictures were taken to show the outline of the heart, then a rubber tube was passed through her nose and ether was blown into the lungs. Three quarters of an hour later, the operation was begun. After exposing the heart through an appropriate incision, fingers of the surgeon's left hand were passed behind the breast bone, and the pleura or membrane covering the lungs was separated from the chest wall. The pericardium or membrane covering the heart was then split in front almost up to the base of the heart thus permitting the bottom of the wound to open widely and exposing the entire heart to view and manipulation. The pulse which had been 180 now dropped to 120, and about ten drops of adrenalin solution was allowed to drip over the heart, followed by some salt solution. At once the heart responded by vigorous and full contractions, and this moment was seized as the most favorable one to operate. Rolling the heart out of its bed, a very fine knife was plunged into the left ventricle or lower chamber about one inch from the apex, and pushed upwards about two and one half inches until it encountered the contracted valve. It was then turned so as to cut through the valve leaflet, and the knife was withdrawn. Stitches had already been placed, and were tied promptly so that little or no bleeding took place. The operation was over at 10 o'clock, the patient seemed in good condition

and was conscious in less than an hour. Her faith and affection for her nurses comforted and helped her toward ultimate recovery, and on the fourth day following operation she was brought into the operating amphitheater and presented to a group of doctors and nurses who had assembled to see the result. On the seventh day all stitches and dressings were removed and the wound showed complete healing.

Drs. Cutler and Levine say that this experience proves that surgical intervention in cases of mitral stenosis bears no special risk to life and should give further courage to other surgeons who will wish to try to alleviate a chronic condition for which there is now no medical treatment and only a fatal outlook. The method was worked out only after years of laboratory experimentation on animals, and according to Dr. Harvey Cushing is epoch-making in its significance.

READING REFERENCE- Outline of Science, Ed. by J. Arthur Thomson. Chapter X., The Body Machine and Its Work. New York, G. P. Putnam's Sons, 1922. Libby, Walter. The History of Medicine and Its Salient Features. Boston and New York, Houghton Mifflin Company, 1922.

ICE AGE SURVIVES IN DEEP MINES

A wave of heat that started some ten thousand years ago has not yet reached the bottom of the deeper copper mines in Michigan, according to Prof. Alfred C. Lane of Tufts College in a communication in the issue of Science for August 24. There the Ice Age climate still survives.

He finds that temperatures at the bottom of the deep mines indicate near-freezing weather at the surface such as might have existed under the ice-sheet that once covered the northern part of the continent.

Prof. Lane asks scientists to help him find out whether Brazil suffered much cooler weather only a few thousand years ago. He suspects so because temperatures in the deepest mine in the world at St. Juan Del Ray indicate a much lower surface temperature than really is the case.

Ice Age climate in deep mines does not mean cool air there since it gets hotter as the depth increases. The temperature of rocks at the lowest level of the Brazilian mine is 117 degrees and the miners work at 98 degrees in the shade.

READING REFERENCE- McCabe, Joseph. Ice Ages. New York, G. P. Putnam's Sons, 1922.

JAPANESE DEVISE NEW PHOTO FLASHLIGHT

A new kind of flashlight for instantaneous photography has been devised by Kyoji Suyehiro, a Japanese physicist, based on researches on exploding wires electrically made by Prof. J. A. Anderson at the Mt. Wilson Observatory in California. Mercury is sucked up in a very fine capillary tube and then through minute wire electrodes burned quickly by electricity. The result is a bright flash whose length depends on the size of the mercury filament.

GERMAN SCIENTISTS MAKE ONE ANIMAL OUT OF TWO

By the application of new and intricate methods of surgery, Professors Sauerbruch and Heyde of Munich and Professor Werner Schulze of the Wurzburg University, have succeeded in uniting two separate living animals into one single living unit.

These artificial "Siamese Twins" show a number of highly interesting phenomena which scientists hope will solve some of life's most deeply hidden secrets. The two united animals live in a cruel and merciless life or death struggle, the experiments show. Each of them labors its hardest to absorb through his blood-circulation all nutriment out of the digested food. In a few weeks one of the pair loses flesh, gets anemic and dies. Dissolution after death shows signs of starvation. But it revenges itself on the victor. If he is not separated from his victim's body, his blood is obliged to circulate through both bodies and can not collect enough oxygen. He dies too, completing an Edgar Allan Poe tragedy in biochemistry.

If one of the two animals gives birth to young, the other shows the signs of pregnancy as well. Both of them begin to produce milk and shortly before the birth begins that animal which is not bearing shows signs of extreme exhaustion, which sometimes are raised to such a degree that it dies during the act. This is the case even if the partner was a male. Sauerbruch and his collaborators explain this circumstance by the supposition that the embryo produces some unknown chemical substances which initiate the act of birth on the mother animal but act as deadly poison on the other.

Out of the four kidneys of the two animals, two can be taken out. The remaining pair of kidneys are able to do the necessary work for both bodies but they grow larger and show signs of overwork.

READING REFERENCES- Thomson, J. Arthur. The wonder of life. New York, Henry Holt & Co., 1915. Locy, William A. Biology and its makers. New York, Henry Holt & Co., 1915.

CHATS ON SCIENCE

COPPER IN COMMON LIFE

By Dr. Edwin E. Slosson

Everyone knows copper, however little he may know about it. The first object to attract his infant eye was very likely the brass knob of a bed or door. He early learned the monetary value of the metal by finding that it was legal tender for saccharine delights at the candy shop or slot machine.

So also in the childhood of the race was copper the first known of the useful metals. Some savage scientist, unknown to fame, picked up a piece of jagged red rock that seemed more serviceable as a knife than the familiar flake of flint. But when he tried to sharpen the edge with a stone hammer he found that instead of chipping off in little shell-shaped scales the strange material gave way beneath the hammer blows without breaking and so could be beaten into any desired form.

We may imagine the pride with which the pre-historic inventor exhibited his new-fangled knife or spear-head to his tribesmen but we may also surmise that they laughed at him for carrying around such a queer contraption, and that when he demonstrated its superiority over flint he was robbed of his invention by some less original but stronger warrior. For we cannot imagine that troglodyte society was so superior to ours that an inventor would meet any better fate than he does nowadays.

Comparatively few people know how beautiful copper is because comparatively few people have ever seen it. What most have seen is but the painted face of copper, the mask it puts on when exposed. To see the metal as it really is one must strip it of its concealing coat by heating it to redness in a glass tube through which hot hydrogen gas is streaming. Then the copper is revealed as a shining silvery metal, delicately tinted with pink like the inner petals of a rose, less garish than gold, less steely than platinum.

But draw the copper from the closed tube and let a breath of air strike it and instantly a blush spreads over its face, deepening to a red, as a baby's skin burns in the seaside sun. This soon darkens to a dull bronze, and further action of the air and moisture gives it a greenish or bluish tint. This fine patina is highly esteemed by artists and antiquarians on roofs and statues but our municipal authorities call it "verdigris" and scratch it off occasionally with a sand-blast. They had better leave it on for both esthetic and economic reasons, for the bare metal cannot stand exposure and no paint is more protective than this that is made by the very atmospheric agencies against which protection is sought. Copper coins and castings, coated with the patina, are preserved intact for thousands of years though buried in damp soil where iron implements would soon vanish in a heap of rust.

The readiness with which copper forms affinities with various elements gave it the name of "the meretricious metal", as the alchemists called it. But this very versatility has its value for human needs, for copper in combination assumes many beautiful and useful forms. The greens and blues of malachite and azurite are gorgeous as any gems, yet they may be had in masses large enough to make table-tops and mantle-pieces. Glass and pottery get various tints from traces of copper, and "blue vitriol" is equally familiar to the electrician and the horticulturist.

Copper is a good mixer and enlarges its field of usefulness by alliances with other metals. Tin gives it the hardness of bronze. Zinc gives it the golden glitter of brass. With nickel and zinc it makes a passable silver. With aluminum, which man has lately learned to extract from common clay, it forms new and useful alloys. The noble metals, gold and silver, in their proudest capacity as coins and jewelry gain strength by alliance with the more plebian copper.

Copper gets its name from the fairest of the goddesses who chose it as the metal of her mirror. This was, it must be confessed, "Hobson's choice", for Venus is older than she looks and when she rose from the sea, somewhere off the island of Cyprus, her first request was for a looking-glass that she might see for herself the reason for the admiration she perceived in all men's eyes. She was not content like Narcissus with the pallid reflection of a pool, which besides could not be carried around with her, so she sought for a suitable metal. There were only two known at the time, gold and copper. Gold she rejected; not, we

must assume, on the ground of expense, for Venus has never lacked admirers eager to pay for her luxuries, but probably because gold cast a sallow tinge on her countenance while copper brightened the tint of her auburn locks and endowed her cheeks with a blush like that of modest maidens.

Anyhow, the handglass of the Cyprian Aphrodite became the symbol of her sex and is still to be found as such in our modern manuals of botany and zoology. The "cyprium" from the Cyprian isle became the "cuprum" of the Romans and the "copper" of the English, and the metal from which was fashioned the jewelry of goddesses and queens was made into pots and pans and the cheapest of coins. A copper button that was proudly worn by a Pharaoh of 4400 B. C. has been found in an Egyptian tomb but it is not nearly so elegant as the buttons that the elevator boy lavishly displays on his uniform.

"Not worth a copper" is the nadir of value yet copper is worth much to the world and never more than in this Age of Electricity.

FINDS CORAL ISLANDS BUILT BY MEAT EATING ANIMALS

The builders of coral reefs and islands are entirely meat eating animals, Dr. T. Wayland Vaughan, of the U. S. Geological Survey told the Pan-Pacific Science Congress at its recent meeting in Melbourne, Australia. In experiments conducted by him in the Tortugas in the Gulf of Mexico, corals persistently refused a vegetable diet, but even water fleas were not swift enough to dodge the lightning-like tentacles of these carnivorous creatures.

The living coral is a branched colony of individuals all connected together and with their soft bodies encased in strong shells. Each individual is little more than a stomach, with a mouth surrounded by tentacles and sheltered in a little cup of the limey skeleton within which the whole colony is enclosed.

Dr. Vaughan described how when a little beef juice or a small bit of meat, usually crab flesh or fish, was offered, the tentacles at the outer edge of the colony would begin to appear. Then the stimulus was transmitted to other members of the colony until ^{soon} the surface of the specimen had opened out like a beautiful flower. This condition, he explains, seems to indicate that the coral colony is hungry and ready to capture food.

Corals have special mechanisms for catching food including tentacles containing stinging cells and cilia, or hair-like extensions of the outer layer of the soft tissue which in response to certain stimuli beat toward the mouth opening; and in response to others beat away from it. The outer surface also secretes mucus in which particles of food may be embedded and this mucus is moved by the beat of the cilia either toward or away from the mouth.

Many different kinds of food were offered orally, Dr. Vaughan said, but they took only animal food. A piece of diatom mat was placed on one side of the coral disc, between the tentacles and the mouth, and a piece of crab meat on the other. Invariably the crab meat was seized and swallowed; while the diatoms induced no reaction except ultimately to be removed from the surface. No kind of purely vegetable food was taken by any one of the numerous species investigated. Pieces of plants coated with small animals soaked in meat juice were swallowed but later the vegetable matter was ejected.

When hunger is entirely satisfied, the tentacles retract and the ciliary motion reverses and particles of food are moved away toward the outside edge of the colony.

At the rate of upward growth observed in the reefs of the West Indies it would take from 6,531 to 7,620 years for the formation of a reef 150 feet thick in one of the species examined, while another could build the same thickness of reef in 1,800 years, while some of the Pacific forms grow still more rapidly and might accomplish as much in 1,000 years.

PATROL BLOWS UP ICEBERG TO SAVE ATLANTIC LINERS

How far the first time in the history of navigation members of the U. S. Coast Guard Service on duty as the International Ice Patrol blew up a mountain of ice with TNT in order to save ships plying the trans-Atlantic tracks from the fate of the Titanic, was told recently by Edward H. Smith of the U. S. Coast Guard who had charge of the work.

An iceberg 350 feet long and with two peaks, the highest estimated to be 170 feet above the water line had drifted well within the warm water of the Gulf Stream south of the Grand Banks of Newfoundland and seriously threatened the safety of large liners crossing the Atlantic. To remove this menace it was decided to attempt to destroy the berg.

Two TNT wrecking mines were lashed together and suspended six feet under water from a float. One of the patrol ship's boats placed this float close under a precipitous face of the berg. As they approached the huge ice mass a continual snapping and cracking, like rifle fire, greeted them, while they could see fissures continually darting and spreading through the ice of the disintegrating berg. Great care was taken in placing the mine and then the boat quickly pulled out of danger and fired the charge. Unfortunately, a fog, which had closed in during these operations, shrouded the effect of the explosion. Those that stood on the deck of the patrol ship, a half mile from the berg, state that the report was followed by a terrific roaring and crashing, rivalling the heaviest thunder, as the ice berg broke apart.

The next day, the berg was found to be appreciably smaller but still of huge size and another mine was used.

Each succeeding day the berg was drifting farther south and becoming a greater menace to steamships. On the fourth day, profiting by previous experience, the approximate center of gravity of the berg was determined and it was decided to place the mine under a smooth wall of ice which was slightly overhanging. Attempt was made to drive a sharpened spike far enough in the ice to hold the mine to be suspended from it, but the motion of the boat prevented this. Attempts were also made to throw grapnels over the projections in the ice, but they failed to hold. Finally a line was shot across the berg so the projectile fell where it was desired to place the mine. The mine was then attached about thirty feet under water.

All the time the boat was kept headed away from the berg, ready to pull off if the berg should start to topple an avalanche of ice from one of its summits.

"When the mine was fired," said Mr. Smith, "it produced a spectacle that is beyond description. A column of water was thrown nearly to the top of the berg. Thousands of tons of ice detached themselves and fell with a mighty roar into the sea. This caused the berg to lighten weight very considerably on the side toward us, rising to a very majestic height. About the time it attained its greatest height a great report was heard and the berg broke squarely into two pieces. The movement appeared to be very slow, in all probability due to the enormous size of the masses of ice."

This wrecking of the iceberg, Mr. Smith explained, undoubtedly removed a danger from the path of speeding liners several days earlier than otherwise.

READING REFERENCE- Collins, Francis A. Sentinels Along Out Coast. New York, Century Company, 1922.

WHITE SNAKEROOT CAUSE OF DEADLY MILK SICKNESS

War on white snakeroot has been declared by the farmers of Indiana. The well-known weed of woodland pastures has been outlawed by the agricultural experts of Purdue University as "the most dangerous plant in Indiana", the established cause of the fatal disease of stock known as "trembles" and the secondary cause of the fatal "milk sickness" of human beings.

Milk sickness was a veritable plague in the early days of the settlements when most of the land was forest. In some sections half of the total number of deaths were caused by it. Several near relatives of Abraham Lincoln died of it when he was a child. The disease has become rare but is not extinct, a number of deaths having been reported in recent years, one as recently as 1920.

It was recognized long ago that the disease followed the drinking of milk from cows which were suffering from "trembles", but the cause of the primary disease in the animals was a mystery. It was discovered, however, that those which fell ill had been grazing in woody pastures where there was much shade, and it was then believed that the eating of some poisonous plant was the cause, but just what the plant was no one knew.

"Trembles", continued to be a not uncommon disease of farm animals, having in this state alone caused the death of 47 sheep, 19 cattle, and 10 horses within the past year, and so the scientists continued their search for the cause if not the remedy for the trouble.

Recent experiments have now demonstrated beyond doubt that the white snakeroot is the "snake in the grass". Animals to which it was fed invariably developed the disease, while if those suffering from it were removed from all possible access to it there was a chance of saving their lives. Whether in the green state or as hay the plant is equally fatal and has a cumulative effect which does not appear until after several feedings.

White snakeroot is rarely found growing in the open, preferring shady woodland. It bears dense masses of small, very white flowers which appear from late August until October. The leaves are set opposite on the stem, are distinguished by three prominent veins and are light and lustrous on the under side, the roots are shallow,

fibrous, and of a "snaky" appearance. The only way to kill the plant is to uproot it as the roots survive mowing.

The disease caused by eating the plant is characterized in animals by severe constipation, lassitude, foul breath, trembling, paralysis, and death. Human beings who drink milk from a cow suffering from trembles have some of these symptoms, especially the constipation, to which is added almost uncontrollable vomiting, great loss of weight and delirium. A professor at Purdue who operates a small farm was ill of the disease two years ago, with five of his family, all of whom recovered after long illnesses.

A curious feature of the poison, which has not been isolated from the plant, is that swine are unaffected by it. They are useful in clearing up infected woodland for they root up the surface soil and eat the snakeroot with impunity. Indiana farmers are being urged to cruise their woodland pastures thoroughly and to completely extirpate the plant, now known as the cause of one of the mystery diseases of modern times.

SCIENTISTS OF WORLD ALLIED AGAINST INSECTS

Entomologists throughout the world are working together in the war against crop insects, according to Dr. L. O. Howard, chief of the Bureau of Entomology of the U. S. Department of Agriculture. Parasites which prey upon damaging insects and keep their numbers down in one country are constantly being drafted by the scientists for use in the fight against the imported pests of another country.

Many of the insects which have found their way into this country from other lands, left their natural enemies behind them. In consequence, they have been able to increase in greater numbers than at home with greater damage to plant life they infest. In order to restore the balance of nature, the entomologists study the life and habits of the insect in its home land. They discover what parasites prey upon it and keep its numbers down. Some of these parasites are then collected and brought to this country to help check the ravages on crops here.

The United States now has an expert in Mexico in search of parasites of the Mexican bean beetle. Another is studying the enemies of the threatening Mexican fruit-fly in that country. Two are in Japan seeking parasites of the Japanese beetle, while another is in that country looking for enemies of the gypsy moth which continues to destroy trees in New England. Two men are just back from Hungary where they also studied the gypsy moth whose native range is all the way from Europe across Siberia to Japan. But nowhere is it so damaging as in America.

Europe has furnished America more of the undesirable insect immigrants than any other section of the world, and the United States now has a complete laboratory with three experts at Heyeres, 70 miles east of Marseilles, France, for the study of the pests native to southern Europe.

Besides these American experts in the field, entomologists of the various nations are in constant communication and frequently make collections of parasites for each other. Generally such exchanges are from the older to the newer countries but America has given effective help of this kind to Europe, notably in the case of parasites of the wooly root louse of the apple. This insect is a native of America, and until the parasites were supplied from here, it was doing great damage in France.

MISTAKES SUBMARINE VOLCANO FOR STEAMSHIP IN SOUTH SEA

What was at first taken to be the smoke of a passing steamer 18 miles northwest of Tongatabu, Tonga Islands, in the South Pacific Ocean, has been found upon investigation by Captain Davey of the Union Steamship Passenger liner Tofoa, to be a column of steam one hundred feet across and rising from a submarine volcano to eighty or ninety feet above the surface. The director of the Apine Observatory, Samoa, reported to the U. S. Hydrographic Office at Washington.

The steam trailed out over the ocean for a mile before becoming dissipated, Captain Davey found, and there was a marked disturbance and discoloration of the water at the point where the vapor arose. This volcano is well southward of the position indicated on the charts for a volcano active in 1911 and vessels have been advised to avoid the locality.

EEL MAKES RECORD TRIP IN AIR-TIGHT BOTTLE

A new long distance record for eel endurance has been established. Dr. Johs. Schmidt, the Copenhagen scientist who discovered the birthplace of eels in the middle of the Atlantic, has just reported the receipt of an silver or little eel mailed him by L. L. Mowbray of the Aquarium at Battery Park, New York. Sealed in a small glass bottle containing two gills of water the tiny creature was in complete darkness during the month's voyage across the Atlantic. But it arrived alive and active. Prof. Schmidt has two live adult American eels that have lived in his aquarium since 1914 when they were brought from the West Indies in beer bottles.

Less than one- two-billionth part of the heat output of the sun falls upon the earth.

The first bananas shipped to London could not be sold at any price and were left to rot because nobody would eat them.

Dogs to provide "pasture" for fleas which are used in testing insecticides are kept on a Department of Agriculture farm near Washington.

A pickle crop twice as large as last year is forecast for this year.

The United States uses about as many incandescent lamps as all the other countries in the world put together.

Crowing hens never lay and should be silenced with an axe.

The construction of the canal through lagunes near Acapulco, Mexico, has brought to light an almost inexhaustible supply of mangrove trees the bark of which is used in the tanning industry.

PINCHOT URGES CONFERENCE ON WORLD RESOURCES

An international conference on the natural resources of the world is urged by Gifford Pinchot, governor of Pennsylvania and conservation advocate, in the foreword to two volumes, the "Forest Resources of the World", just published. This book by Raphael Zon and William N. Sparhawk was prepared by the U. S. Department of Agriculture in cooperation with the National Research Council.

"Theodore Roosevelt, in the last days of his presidency, took steps to call an international conference for the purpose of preparing an inventory of the natural resources of the world," Gov. Pinchot writes. "Such a conference would be most timely now. It would not only bring together the known facts as to the extent and location of these resources, but could also outline general principles for their development and conservation. Forest resources naturally would be one of the principal subjects of consideration. Arrangements would be made for the uniform collection of statistics regarding forest areas, kinds and amounts of standing and growing timber, and production, consumption, and trade in forest products.

"Such a conference would be particularly valuable at the time when a great part of the world is out of adjustment, after an exhausting war, and is eagerly seeking means of creating the new economic relationships which are essential for its normal development. Access to raw materials on equal terms for all countries is one of the fundamental needs if peace is to be preserved and economic rivalries kept within bounds. An inventory of the natural resources of the world is indispensable for the formulation of any international policy for developing them for the benefit both of the world at large and of the individual nations within whose boundaries they lie."

ITALIANS CLAIM SCARLET FEVER GERM DISCOVERY

The cause of scarlet fever has been discovered according to claims of Italian investigators in reports that have reached the American Medical Association. In 1921 Prof. G. di Cristina of the University of Palermo isolated from scarlet fever patients a small double celled micro-organism that can exist without oxygen. Now Prof. G. Caronia and Dr. M. B. Sindoni at Rome have confirmed his work and assert that the organism causes the disease. By inoculating first rabbits and then children with cultures of the organism they claim to have produced scarlet fever experimentally.

Officials of the American Medical Association point out that other investigators have claimed from time to time without acceptance the discovery of organisms presumed to cause scarlet fever. Although the Italian evidence is more extensive they any yet offered, they point out that more experience and investigation will be required before these claims can be fully accepted.

The skinning of frog legs by an Italian scientist to make a soup for his sick wife led to the epoch-making discovery that electricity can be generated by chemical means which was the forerunner of the present-day primary battery.